

Date: Friday, 13/06/2008 10:46:44 AM  
 User: Julie Lecocq

## Process Sheet

<b>Customer</b> :	CU-DAR001 Dart Helicopters Services	<b>Drawing Name</b> :	407 HIGH AFT X-TUBE ASSEMBLY
<b>Job Number</b> :	39856	<b>Part Number</b> :	D407667205TRN
<b>Estimate Number</b> :	13208	<b>Drawing Number</b> :	D407-667-245 REV D
<b>P.O. Number</b> :		<b>Project Number</b> :	N/A
<b>This Issue</b> :	13/06/2008	<b>Drawing Revision</b> :	D
<b>Prsht Rev.</b> :	NC	<b>Material</b> :	
<b>First Issue</b> :	1/1	<b>Due Date</b> :	20/06/2008
<b>Previous Run</b> :	39392	<b>Qty:</b>	1 Um: Each
<b>Written By</b> :			
<b>Checked &amp; Approved By</b> :	JUL 08.10.13		
<b>Comment</b> :	Est Rev:A 08-03-06 new issue DD verified by:ec Est Rev B 08.04.02 Removed polish EC verified by: DD		

## Additional Product

Job Number:



<b>Seq. #:</b>	<b>Machine Or Operation:</b>	<b>Description :</b>
----------------	------------------------------	----------------------

1.0	D6011115	Crosstube Material
-----	----------	--------------------



**Comment:** Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part number	Description	Batch
1	D6011-115	Crosstube	B 32301

Check OD = 2.750"; ID = 1.450"

a.m 08.06.17 ①

2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
-----	------------	----------------------------

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand &amp; install plugs DT8531 on both ends as per Folio FA248

2-Turn first side as per Folio FA248

3- File transition lines smooth.

a.m 08.06.17 ①

3.0	QC1	INSPECT ALL DIM TO DIM SHEET
-----	-----	------------------------------

**Comment:** INSPECT ALL DIM TO DIM SHEET

a.m 08.06.17 ①

4.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
-----	------------	----------------------------

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA248

2- File transition lines smooth.

3-Remove sand and plugs

a.m 08.06.17 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 13/06/2008 10:46:44 AM  
User: Julie Lecocq

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 407 HIGH AFT X-TUBE ASSEMBLY

Job Number: 39856

Part Number: D407667205TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

4-Scribe part # and batch # using vibrating stylus as per Dwg D407-667-245

Inside of Cuff(Donot engrave on outside of tube)

*a.m 08.06.17*

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

*a.m 08.06.17*

6.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*8 08/06/18*

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

Ensure no sand is in the tube before alodine.

*FT 08-06-19*

8.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

*BE 08-06-19*

9.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and stock in kanban rack

Location: *X tube cell*

*FT 08-06-19*

10.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

*08/06/20*

Job Completion



*mf 08-06-19*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 39856
<b>Description:</b> Crosstube Assembly		<b>Part Number:</b> D407-667-245
<b>Inspection Dwg:</b> D407-667-245 <b>Rev:</b> D		<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ **First Article**
☐ **Prototype**

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.490	+0.005/-0.000	2.493	✓			
	1.832	+0.005/-0.000	1.837	✓			
	1.838	+0.005/-0.000	1.843	✓			
	1.892	+0.005/-0.000	1.897	✓			
	2.052	+0.005/-0.000	2.057	✓			
	2.206	+0.005/-0.000	2.210	✓			
	2.521	+0.005/-0.000	2.526	✓			
	2.633	+0.005/-0.000	2.636	✓			
	4.10	+/-0.030	4.10	✓			
	4.978	+/-0.030	4.978	✓			
	2.040	+0.000/-0.010	2.035	✓			
	0.125	+/-0.010	0.125	✓			
	R0.063	+/-0.010	R0.063	✓			
	R0.500	+/-0.010	R0.500	✓			
SIDE B	2.490	+0.005/-0.000	2.493	✓			
	1.832	+0.005/-0.000	1.837	✓			
	1.838	+0.005/-0.000	1.843	✓			
	1.892	+0.005/-0.000	1.897	✓			
	2.052	+0.005/-0.000	2.057	✓			
	2.206	+0.005/-0.000	2.210	✓			
	2.521	+0.005/-0.000	2.526	✓			
	2.633	+0.005/-0.000	2.636	✓			
	4.10	+/-0.030	4.10	✓			
	4.978	+/-0.030	4.978	✓			
	2.040	+0.000/-0.010	2.035	✓			
	0.125	+/-0.010	0.125	✓			
	R0.063	+/-0.010	R0.063	✓			
	R0.500	+/-0.010	R0.500	✓			
	112.91	+/-0.020	112.910	✓			

<b>Measured by:</b> [Signature]	<b>Audited by:</b> [Signature]	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 08.06.17	<b>Date:</b> 08/06/18	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	04.04.21	New Issue (P/O D407-667-205)	KJ/RF	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	06.03.30	Tolerance revised for 4.978 dimension	KJ/JLM	
D	07.02.19	Dwg Rev updated	KJ/JLM	[Signature]

**DART**

DESIGN <i>PH</i>	DRAWN BY <i>PH</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>H</i>	APPROVED <i>H</i>	DRAWING NO. D407-667-245	REV. D SHEET 1 OF 3
DATE 07.02.07		TITLE CROSSTUBE ASS'Y (407 HIGH AFT) SCALE NTS	
A	02.05.13	NEW ISSUE	
B	03.05.21	ADD CHAFING SHIELD	
C	05.07.26	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
D	07.02.07	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	

RELEASED

07.02.14 *H*

Qty	Part Number	Description
X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
1	D6011-115	CROSSTUBE
2	D2856-400-773	ABRASION STRIP
2	D2873-043	NUT PLATE
2	D2873-045	NUT PLATE
1	D2894-1	SUPPORT
2	D3190-1	CHAFING SHIELD
2	D3595-075-430	RUBBER CUSHION
14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
4	MS21920-22	CLAMP
2	MS21920-25	CLAMP (OR MS21920-24)

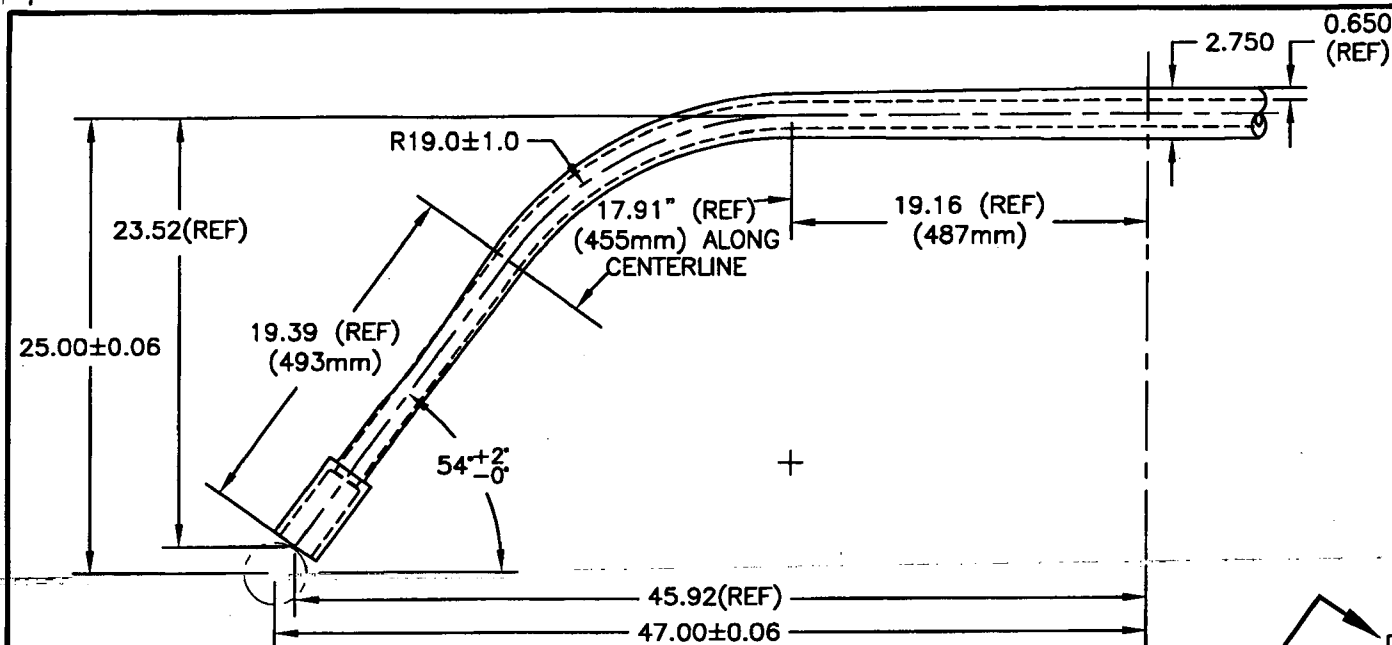
**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6011-115  
FINISHED LENGTH = 112.91±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS WITH D3595-075-430 RUBBER CUSHIONS TO SECURE D2894-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.  
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB.
- 14) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE OPPOSITE D2894-1 SUPPORT.

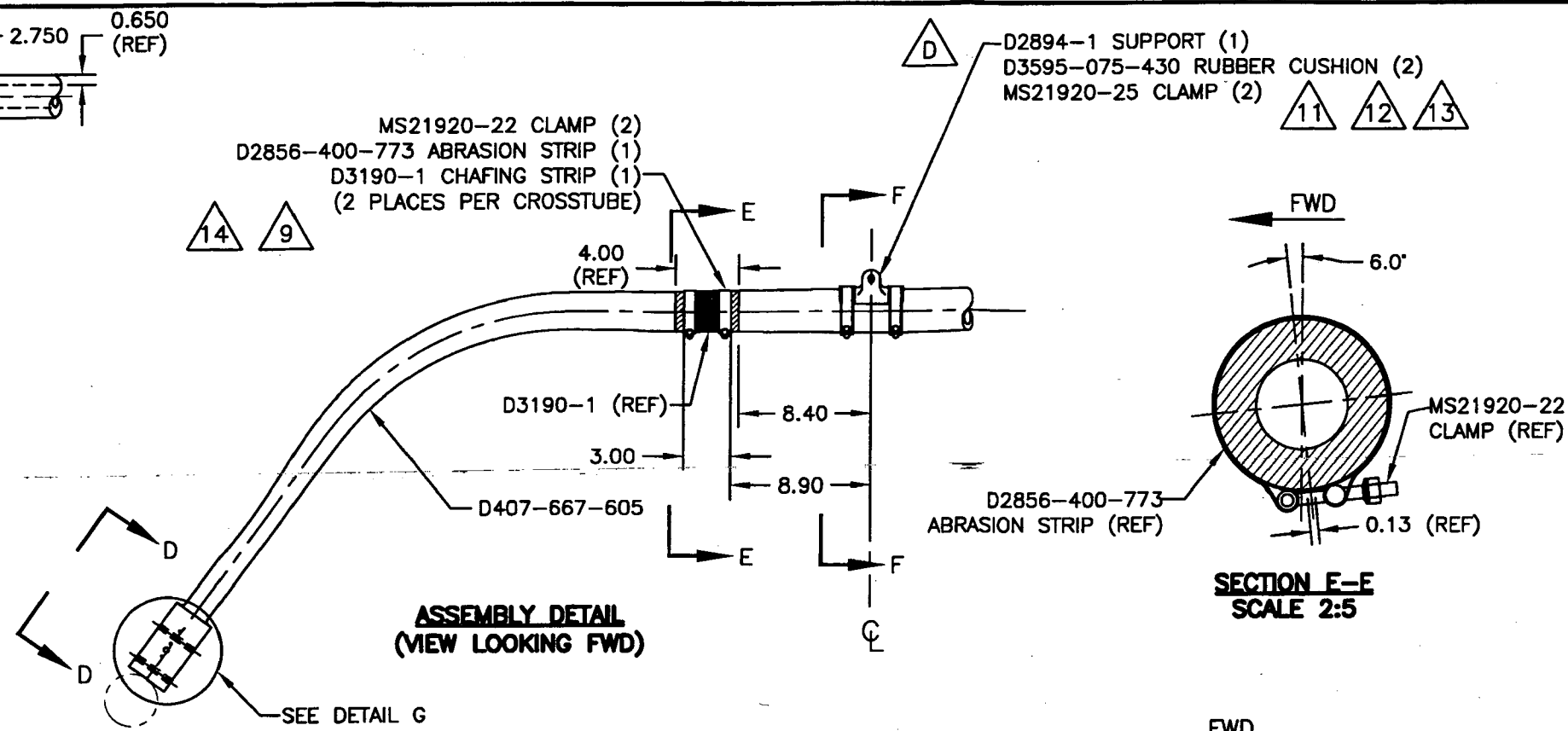
SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. *39856*

Copyright © 2002 by DART AEROSPACE LTD

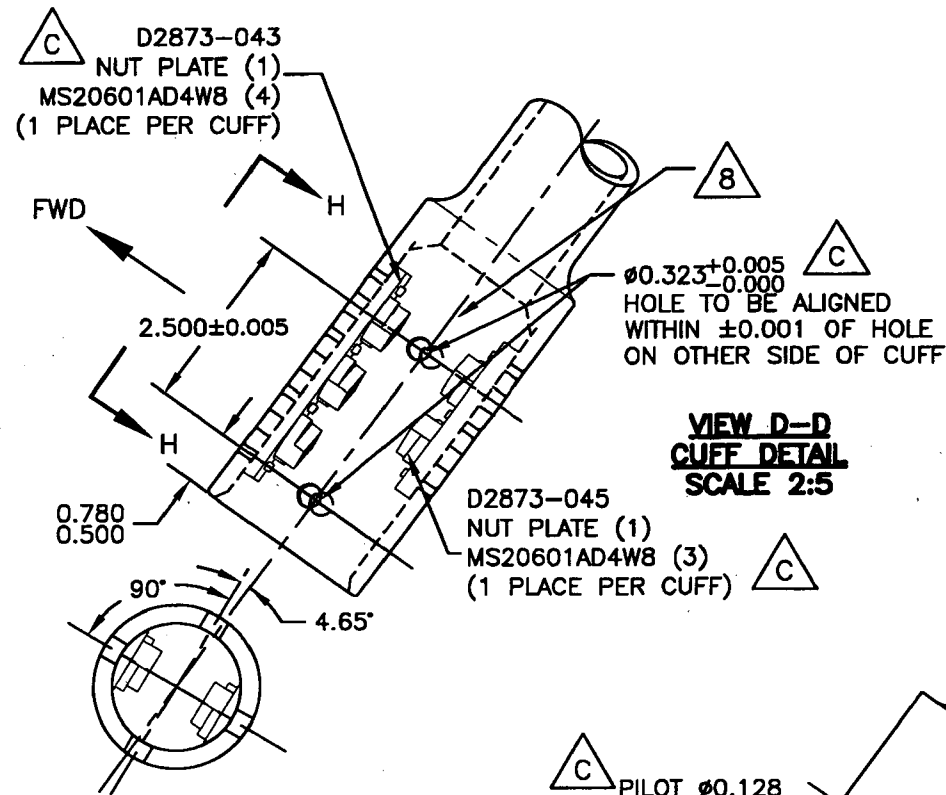
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



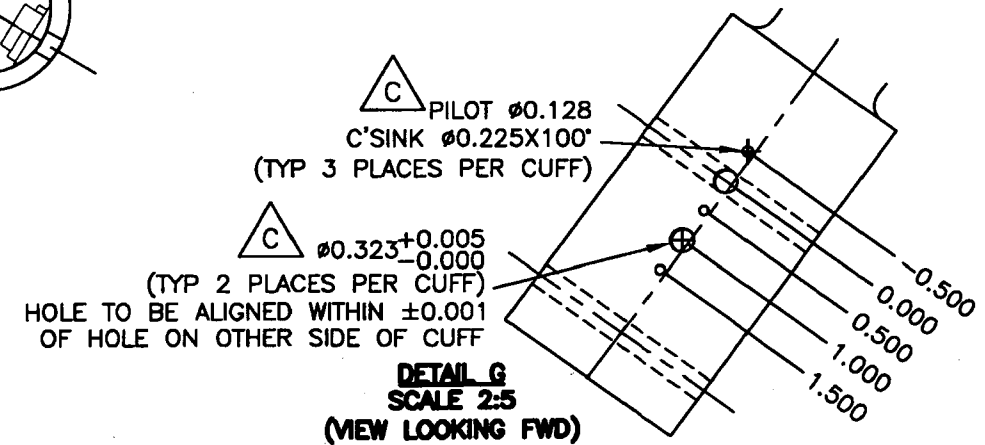
**BENDING DETAIL 6**



**ASSEMBLY DETAIL  
(VIEW LOOKING FWD)**



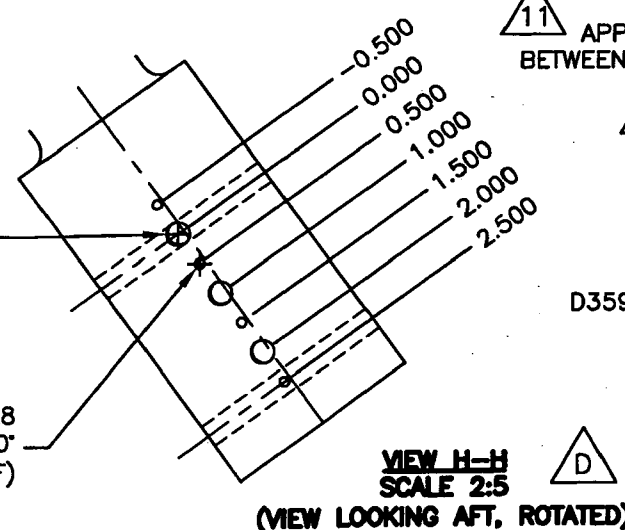
**VIEW D-D  
CUFF DETAIL  
SCALE 2:5**



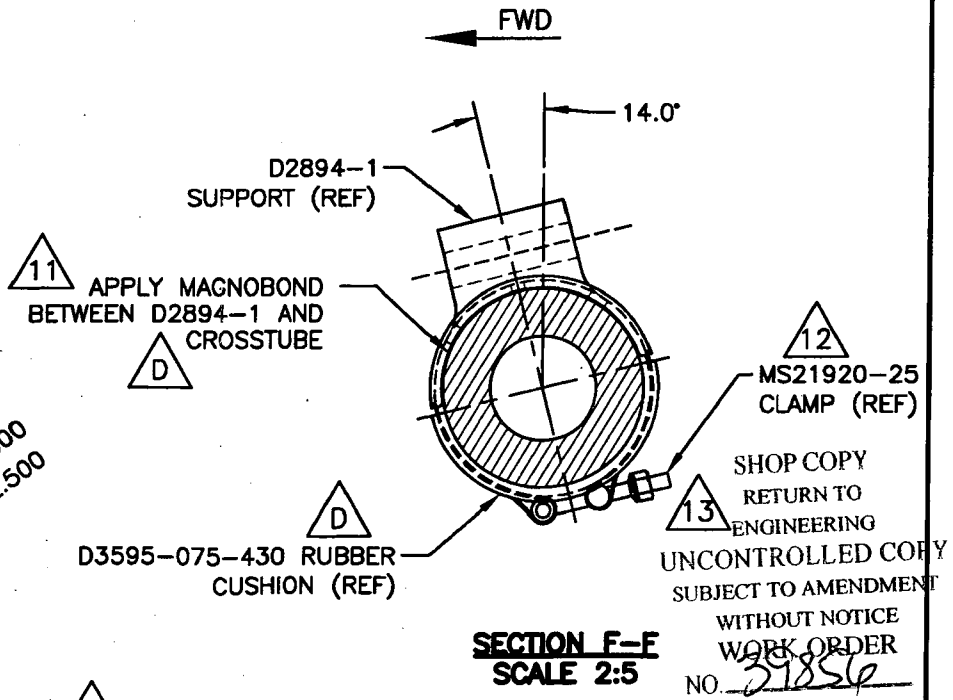
**DETAIL G  
SCALE 2:5  
(VIEW LOOKING FWD)**

0.323<sup>+0.005</sup><sub>-0.000</sub>  
(TYP 3 PLACES PER CUFF)  
HOLE TO BE ALIGNED WITHIN ±0.001  
OF HOLE ON OTHER SIDE OF CUFF

PILOT 0.128  
C'SINK 0.225X100\"/>



**VIEW H-H  
SCALE 2:5  
(VIEW LOOKING AFT, ROTATED)**



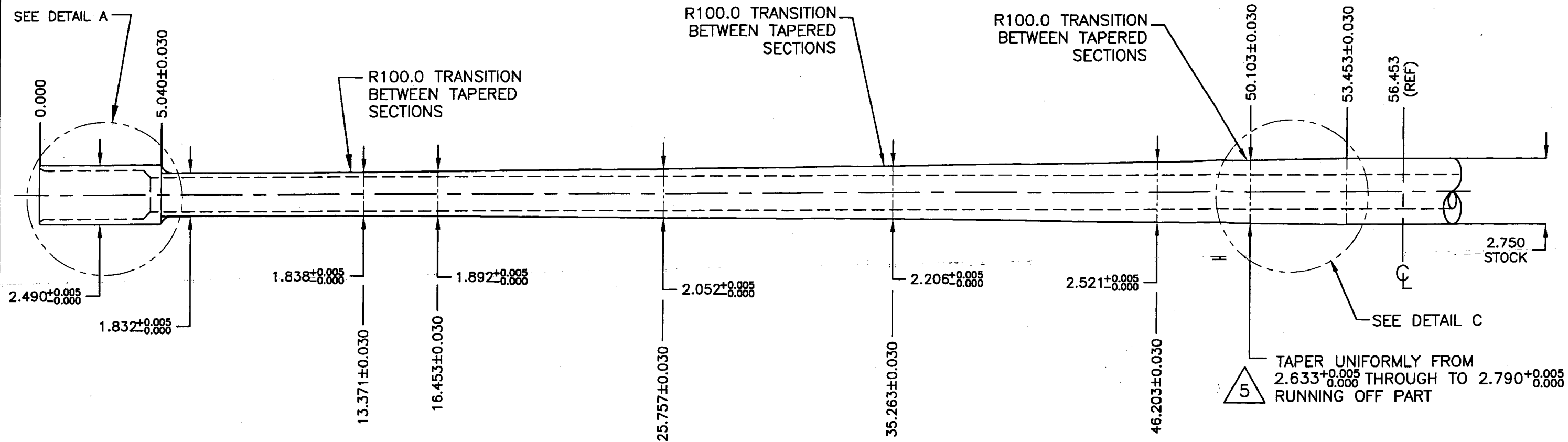
**SECTION F-F  
SCALE 2:5**

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 39856

COPYRIGHT © 2002 BY DART AEROSPACE LTD.		DESIGN PH	DRAWN BY PH	<b>DART</b>	DART AEROSPACE LTD. HAMMERSBURY, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED PH	APPROVED PH	DRAWING NO. D407-667-245	REV. D SHEET 2 OF 3
DATE 07.02.07		TITLE CROSSTUBE ASS'Y (407 HIGH AFT)		SCALE 1:10	

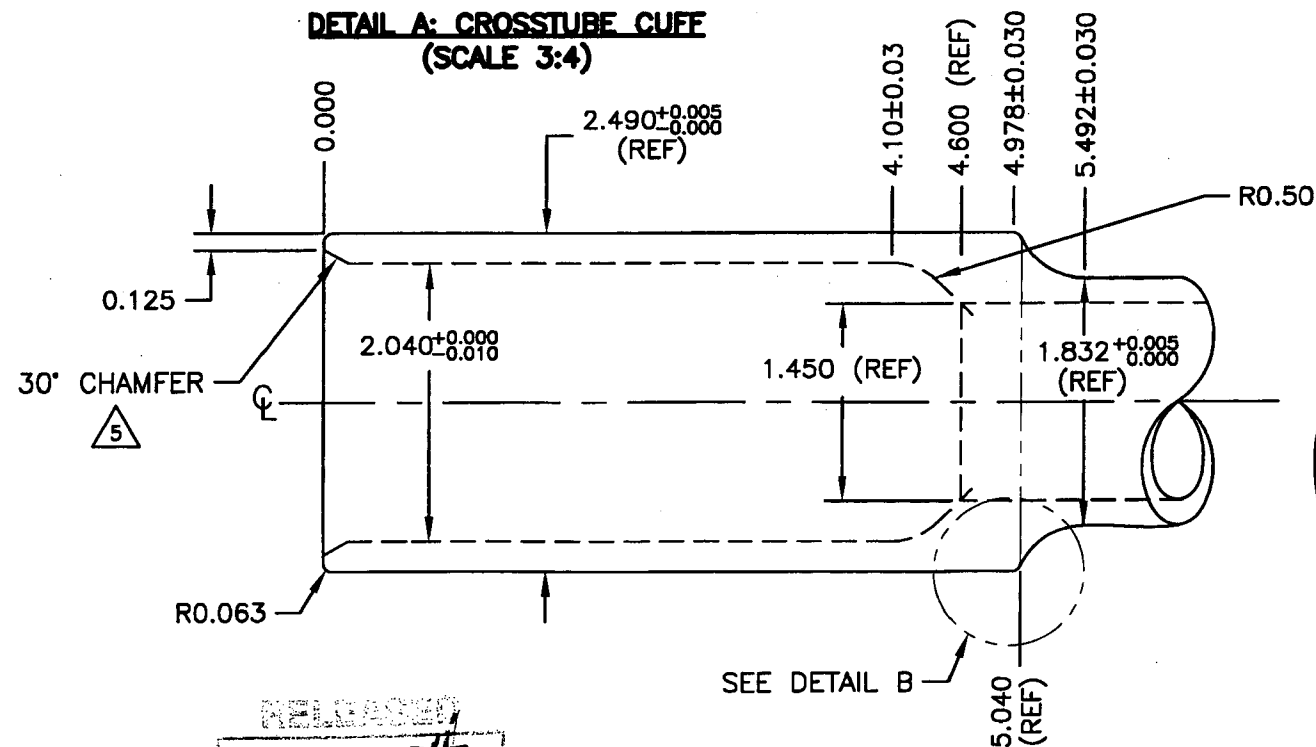




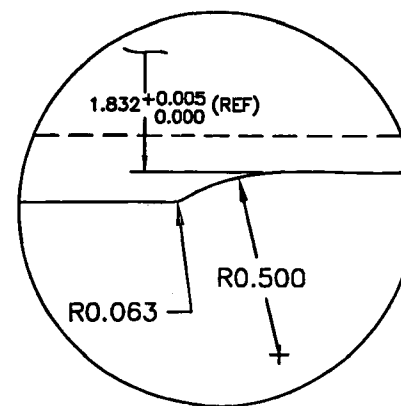


# D407-667-245 MACHINING DETAIL

DETAIL A: CROSSTUBE CUFF  
(SCALE 3:4)

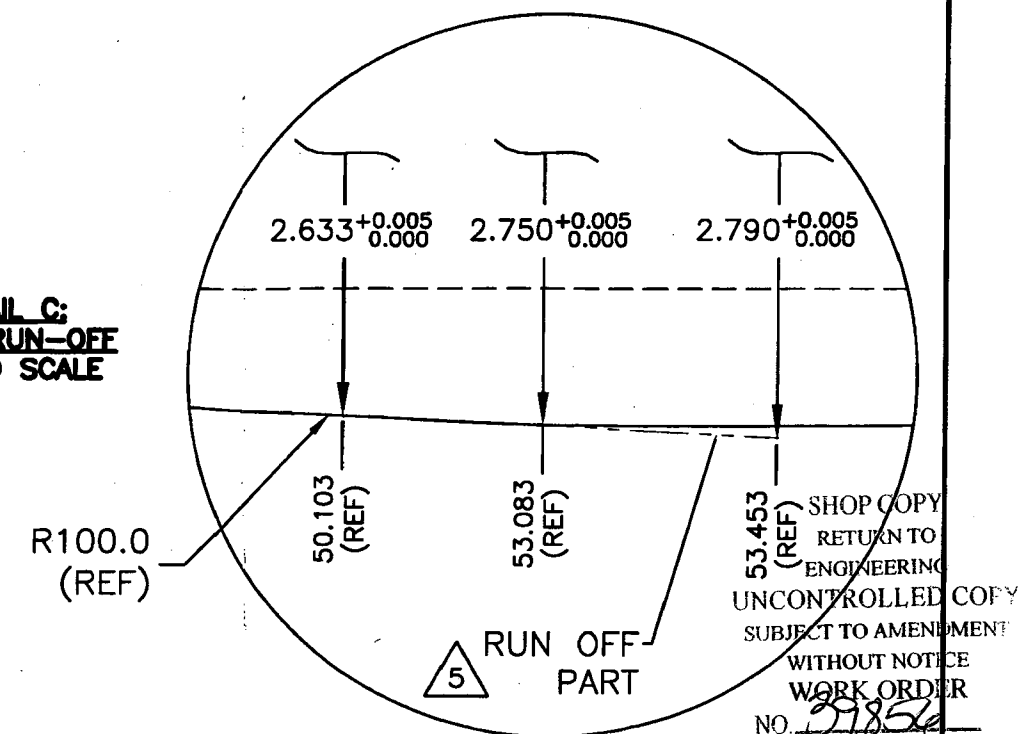


RELEASED  
07.02.14



DETAIL B: CUFF  
TRANSITION  
SCALE 2:1

DETAIL C:  
TAPER RUN-OFF  
NOT TO SCALE



COPYRIGHT © 2002 BY DART AEROSPACE LTD.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL  
AND IS SUPPLIED ON THE EXPRESS CONDITION  
THAT IT IS NOT TO BE USED FOR ANY PURPOSE  
OR COPIED OR COMMUNICATED TO ANY OTHER  
PERSON WITHOUT WRITTEN PERMISSION FROM  
DART AEROSPACE LTD.

DESIGN PH	DRAWN BY PH	<b>DART</b>	DART AEROSPACE LTD. HAMPSHIRE, ONTARIO, CANADA
CHECKED H	APPROVED H	DRAWING NO. D407-667-245	REV. D SHEET 3 OF 3
DATE 07.02.07	TITLE CROSSTUBE ASS'Y (407 HIGH AFT)	SCALE 1:4	

